King County
Department of
Transportation

South Park Bridge

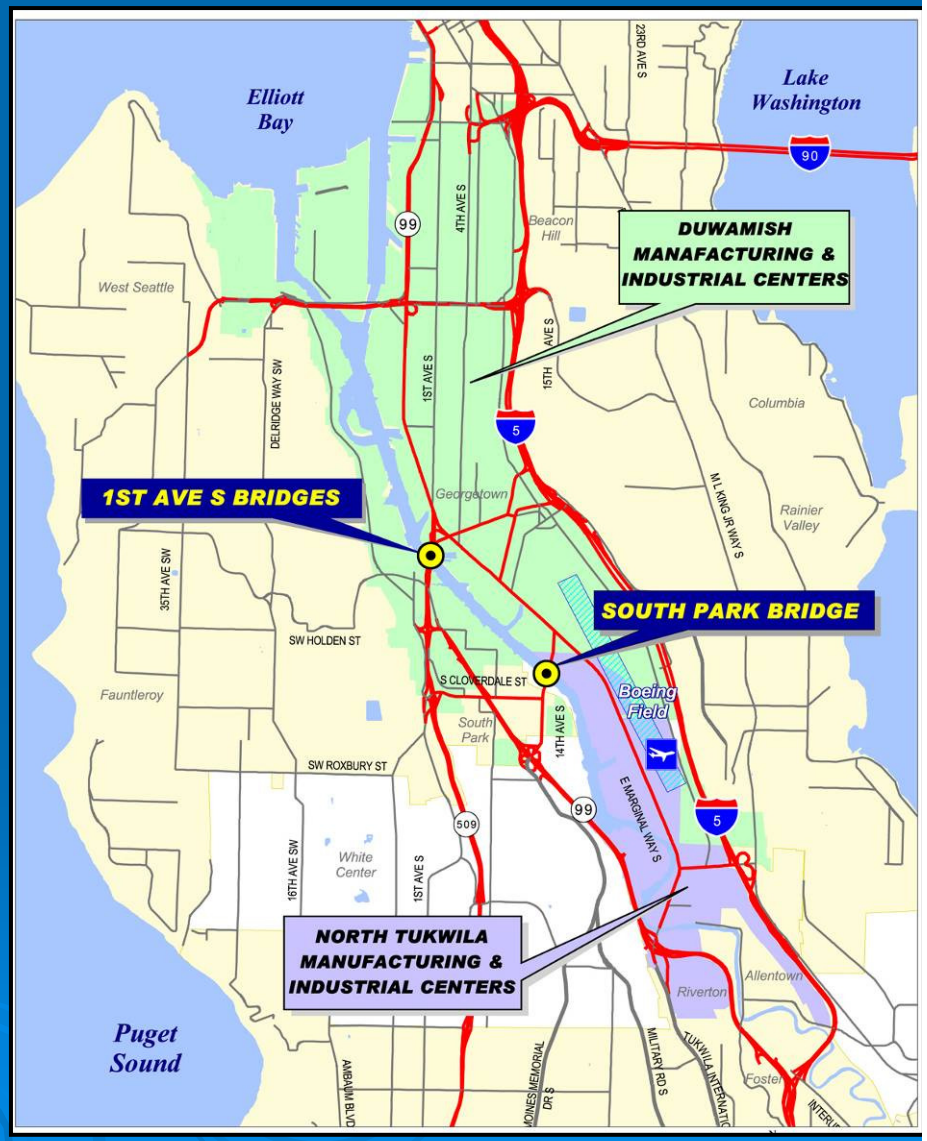
Current Condition

Seattle City Council – Briefing

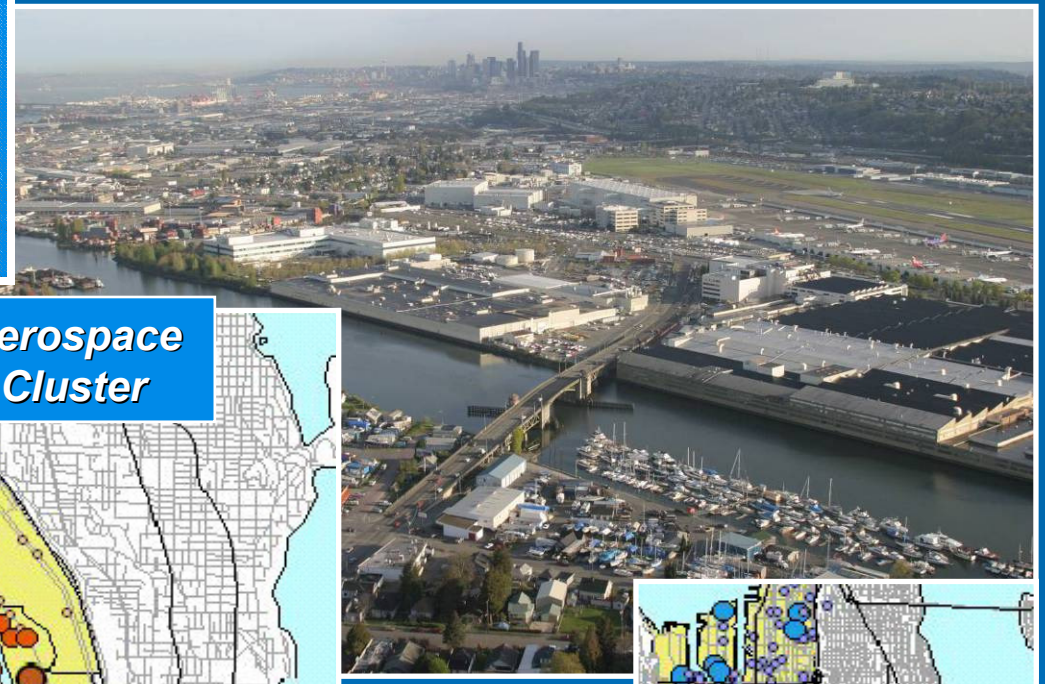
April 12, 2010

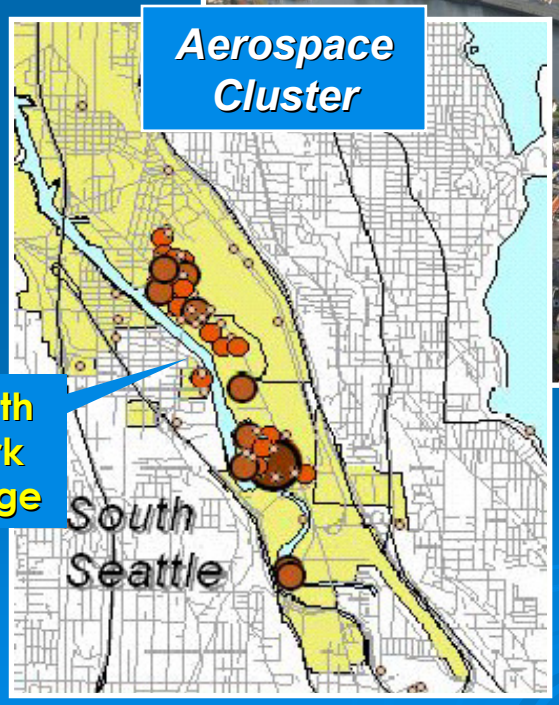
BRIDGE FACTS

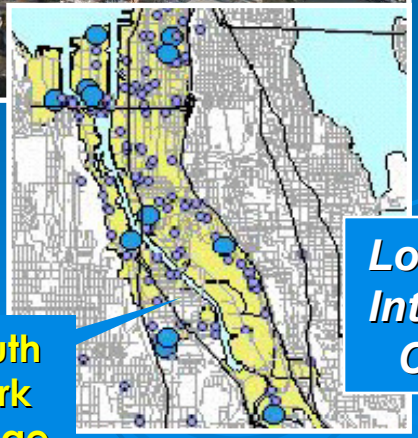
- 14th / 16th Avenue South over Duwamish Waterway
- Bridge built in 1929-1931
- Essential link provides access to the largest industrial area of the state
- 20,000 vehicles per day
- 14% trucks / freight
- Critical facility carrying 4-10 million tons of freight per year
- One of only a few river crossings in industrial area



Industrial Clusters Surround Bridge







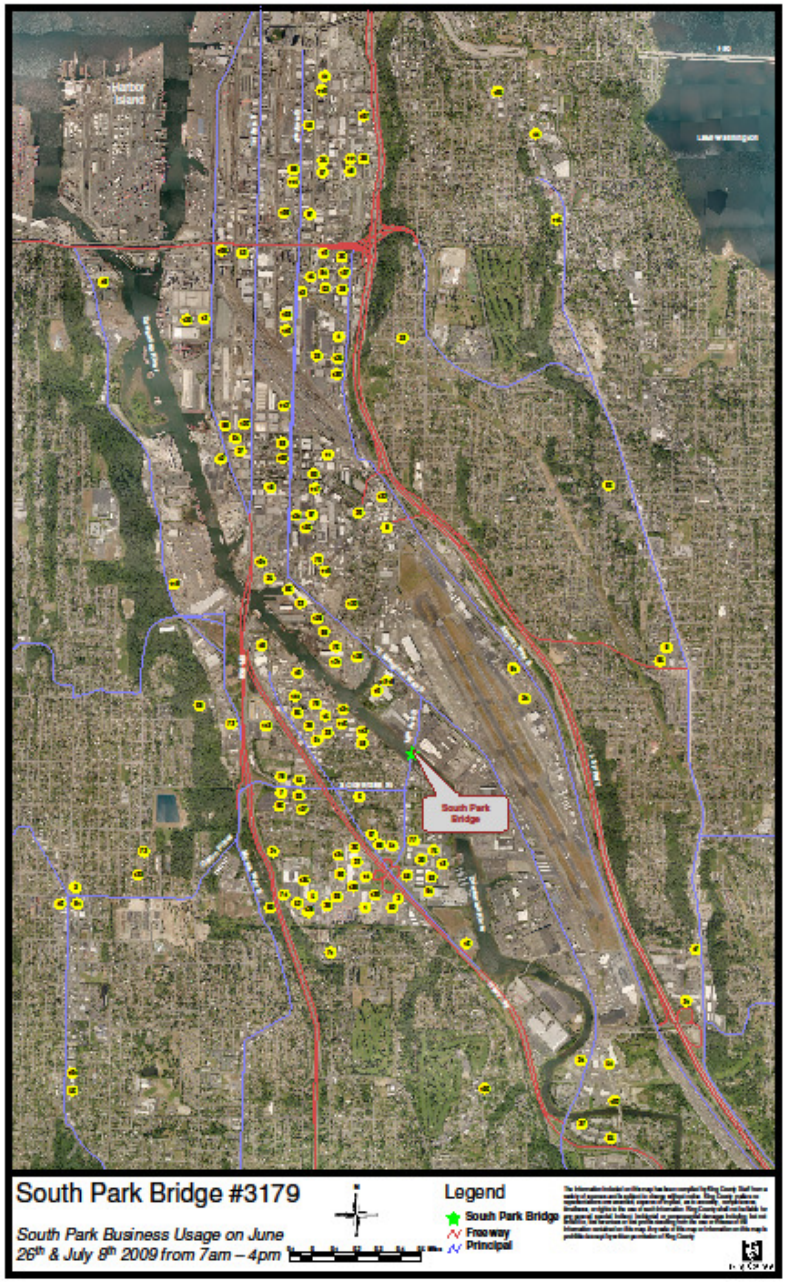
Over **17,000 employed** in targeted cluster industries within one mile of bridge

Over **80,000 jobs** in both M&I Centers

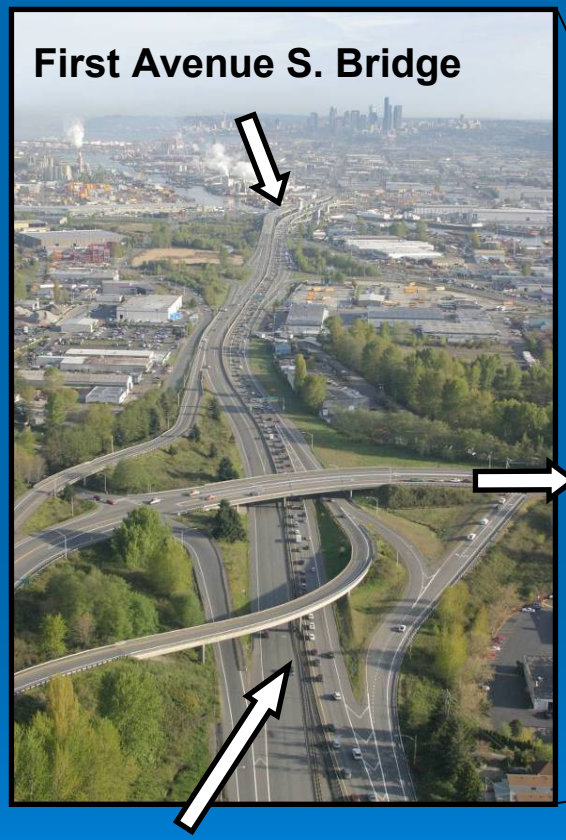
Businesses in Manufacturing and Industrial Districts use South Park Bridge extensively

142 different businesses used bridge during 2-day survey

Survey taken
June 26 & July 8, 2009



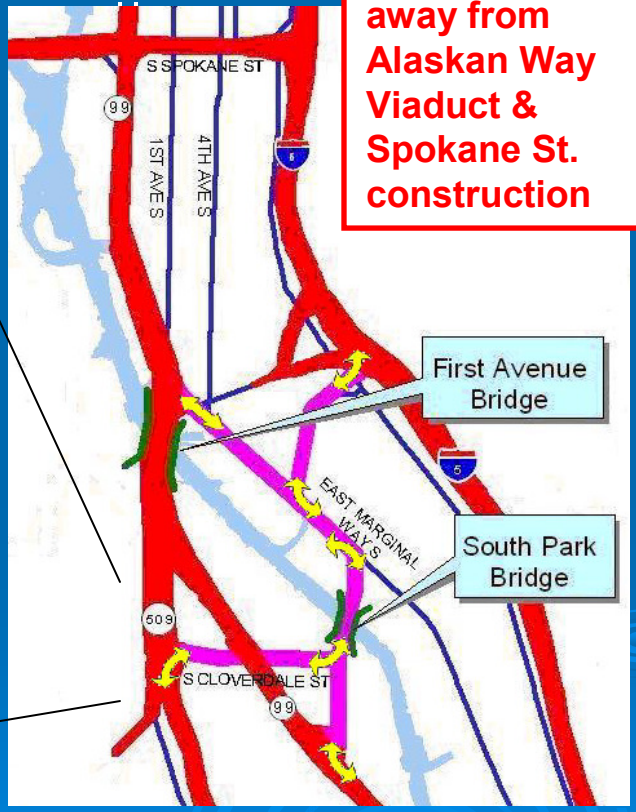
Bridge important to regional traffic flow and efficient movement of freight



To South Park Bridge

Existing traffic queues already long approaching First Avenue South Bridge

South Park Bridge helps direct traffic away from Alaskan Way Viaduct & Spokane St. construction

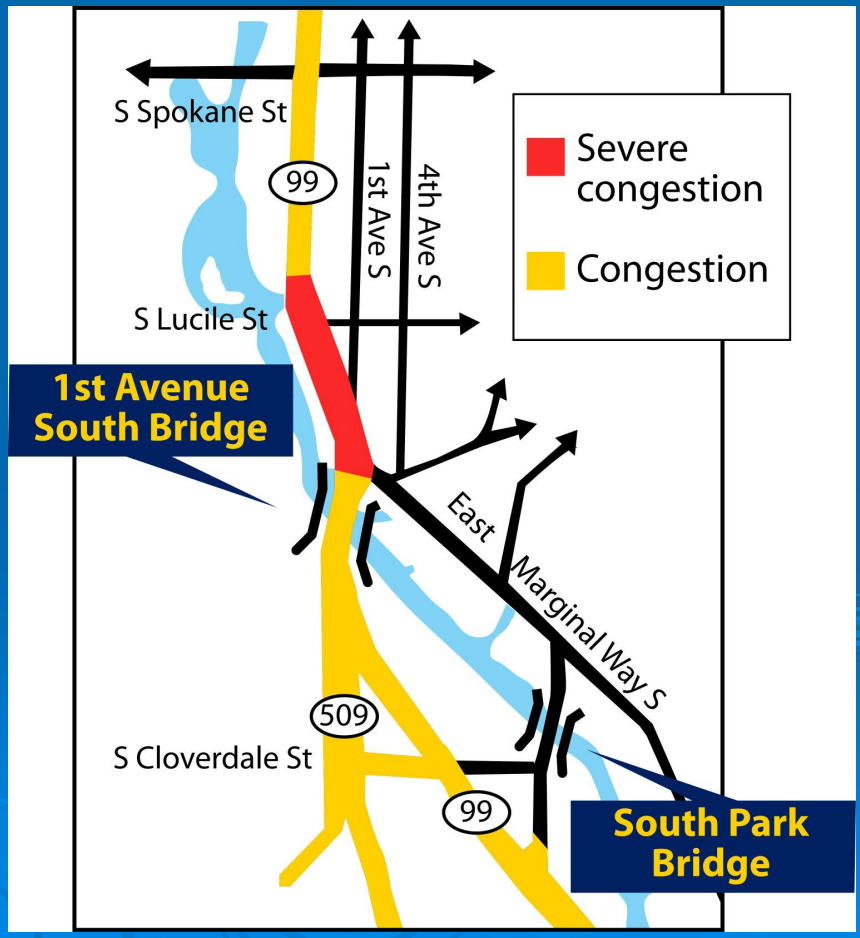


Improves efficiency of SR-99 and SR-509 corridors

TRAFFIC MOVEMENTS

First, a look at the current traffic flow during commute periods

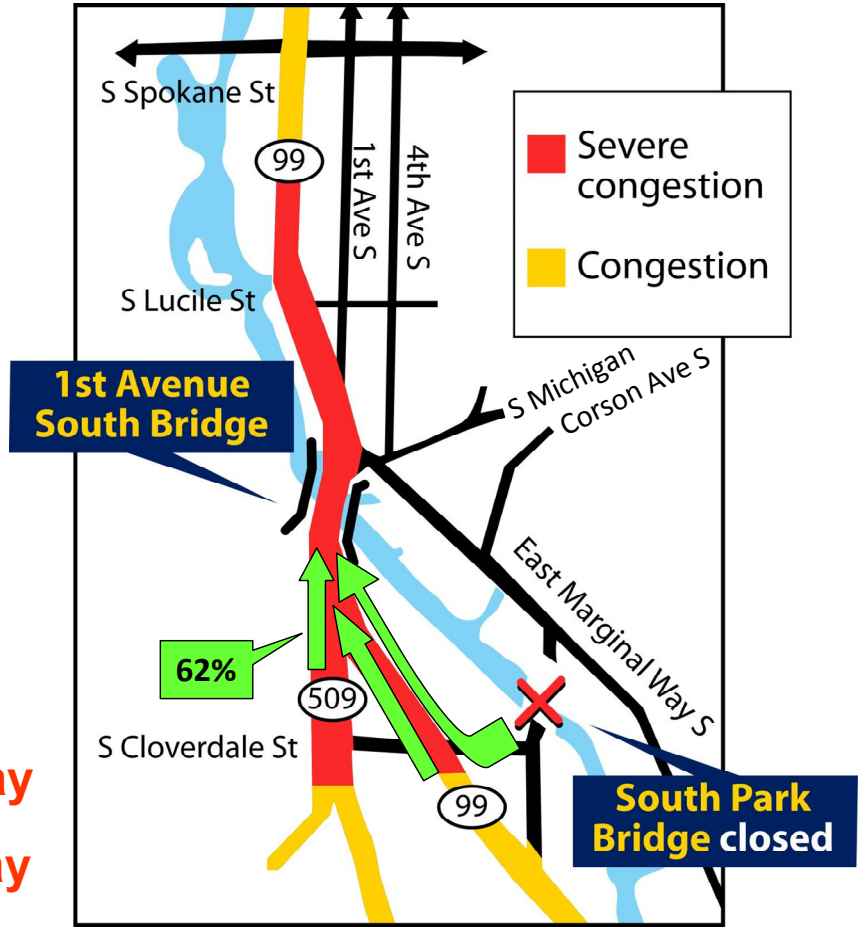
Red = LOS E&F from Travel Demand models



Origin & Destination Survey 8-25-09

Northbound traffic

"If the bridge closes, what alternate route will you take?"



South Park Bridge = 20,000 vehicles/day

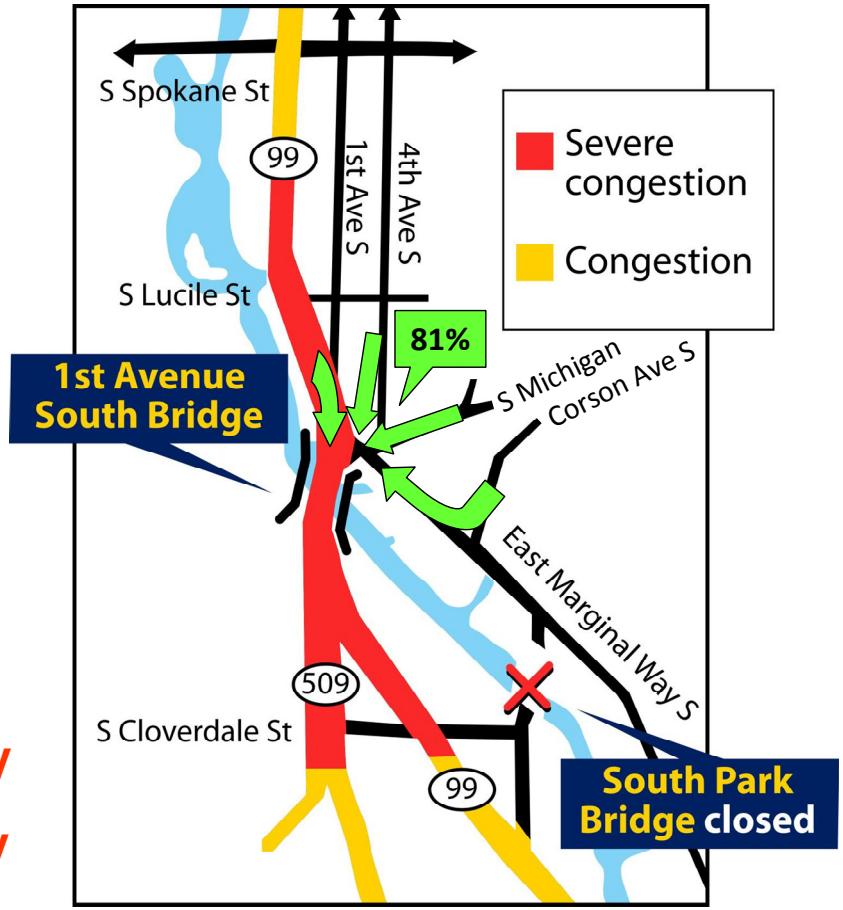
First Ave S Bridge = 77,000 vehicles/day

Closure adds 12,400 vehicles/day

Origin & Destination Survey 8-25-09

Southbound traffic

"If the bridge closes, what alternate route will you take?"

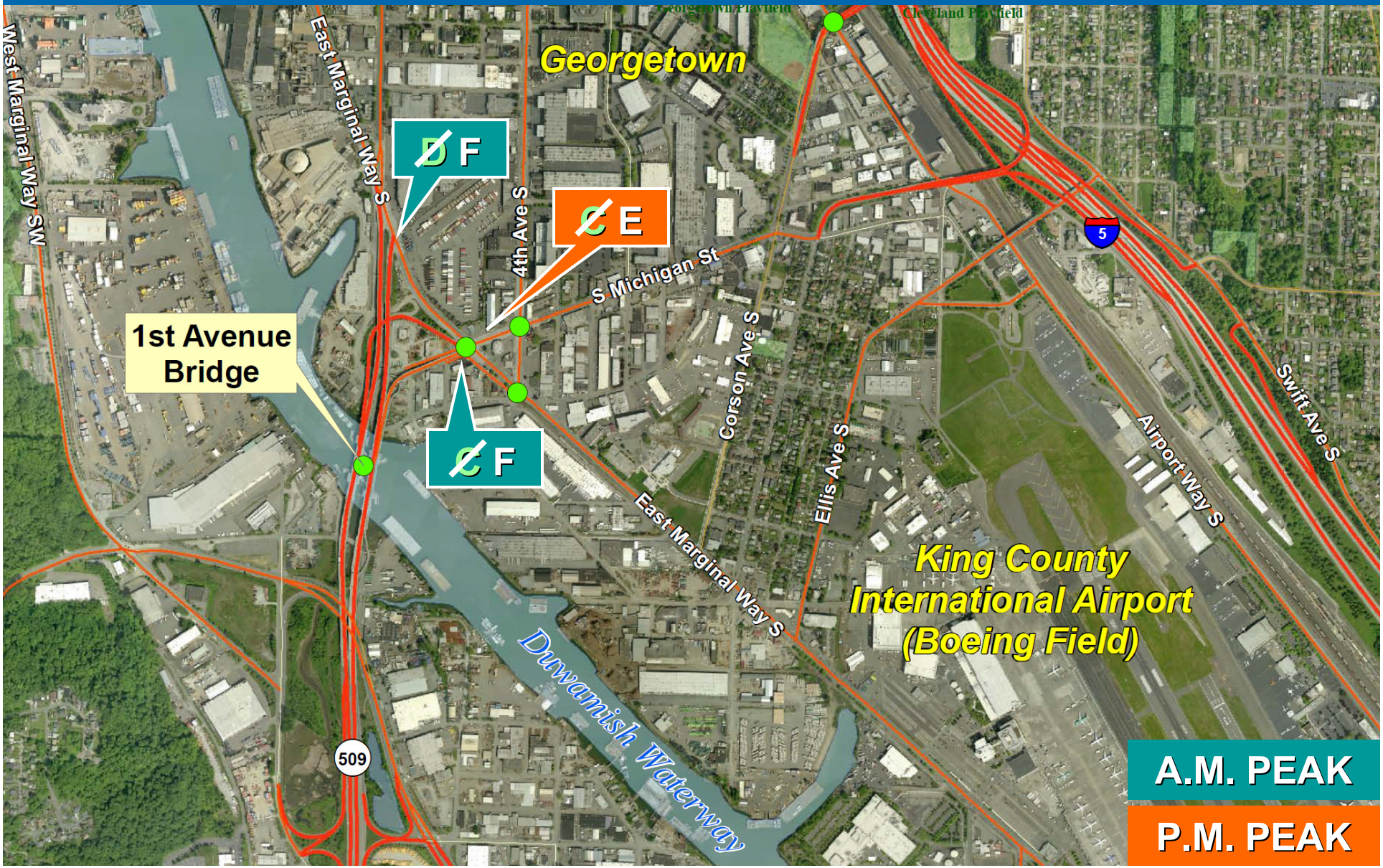


South Park Bridge = 20,000 vehicles/day

First Ave S Bridge = 77,000 vehicles/day

Closure adds 16,200 vehicles/day

LEVEL OF SERVICE CHANGES



Bridge Current Condition

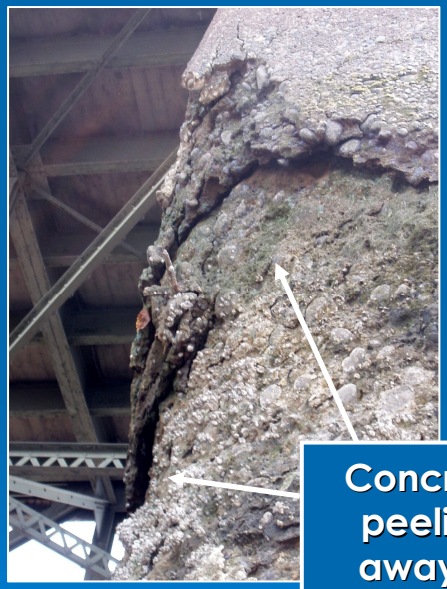
Four Major Deficiencies

- Concrete deterioration
- Substructure unstable / tilting
- Concrete piers cracking
- High seismic risk

Concrete Deterioration

- Unpredictable strength of concrete
- Chemical deterioration due to chemical imbalance - **cannot be fixed**

Aggregate pulls away from mortar



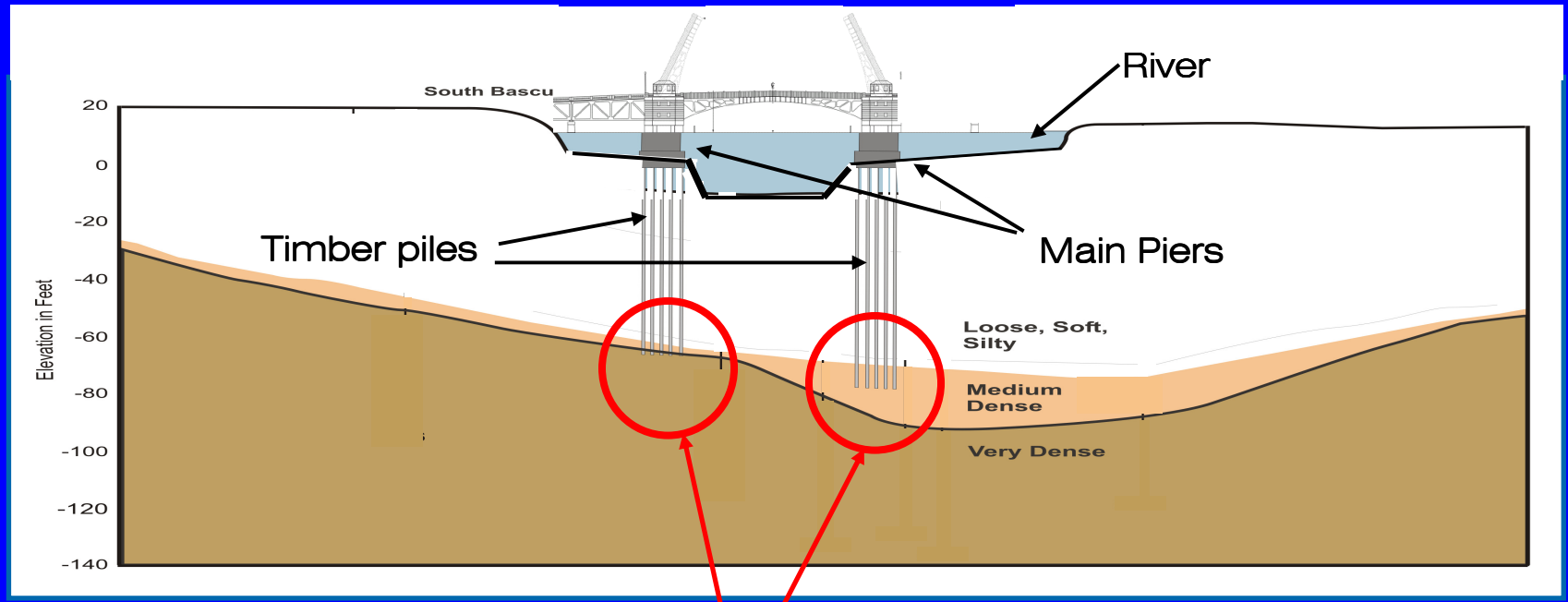
Concrete peeling away in layers

Concrete deterioration of main pier

Loss of concrete from pier

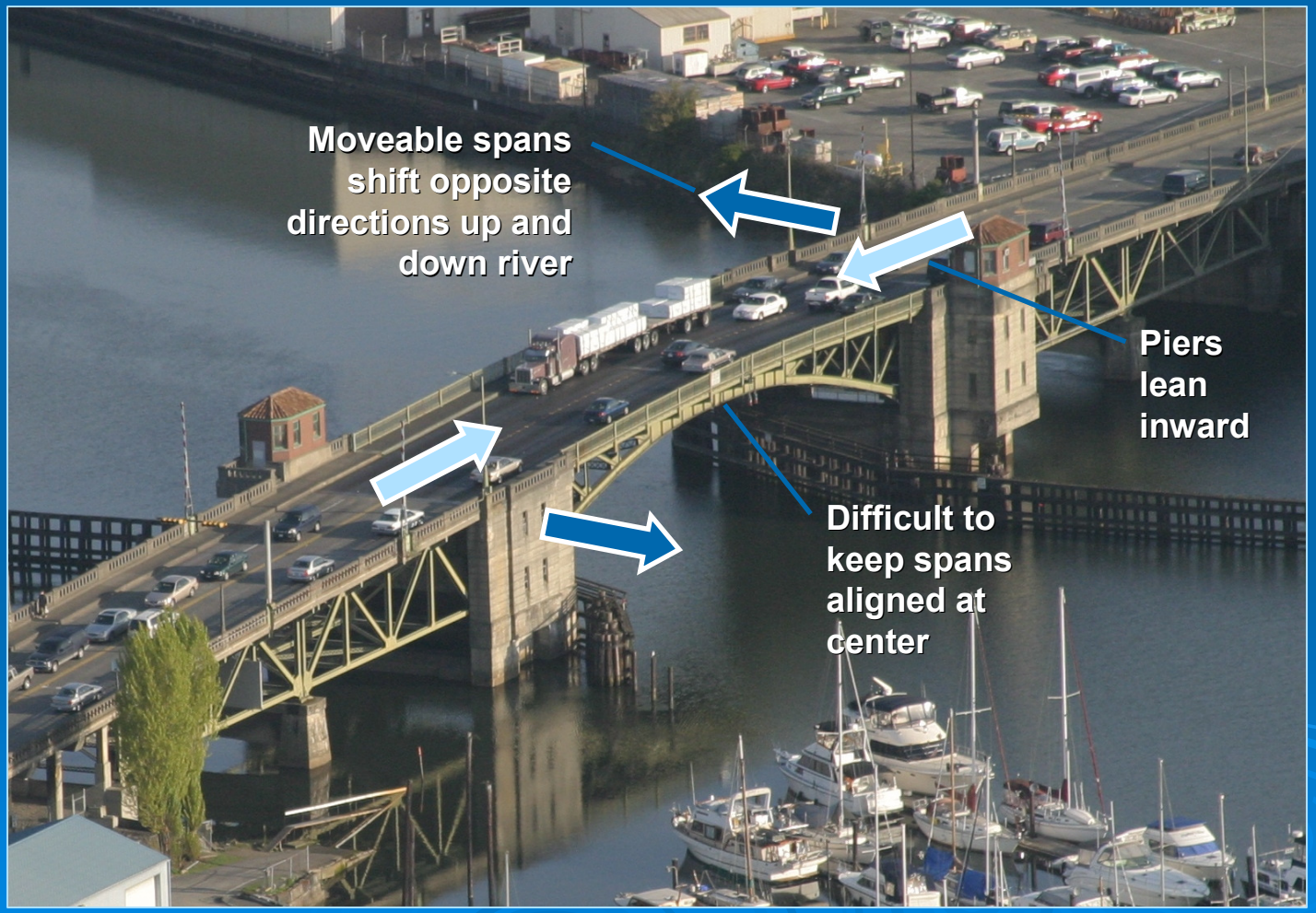
Substructure
Unstable / Tilting

Section cut of riverbed and bridge piers



Piling driven short of competent soil - inadequate to support bridge piers…

…causing main piers to move – CAN'T BE FIXED

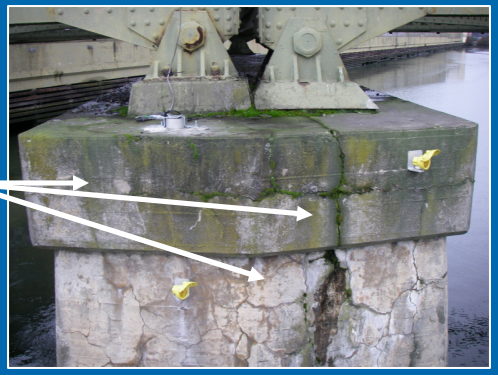


Spans nearly touch at center of main span

Gap between leaf tips now 3/8” and closing

Concrete Piers Cracking

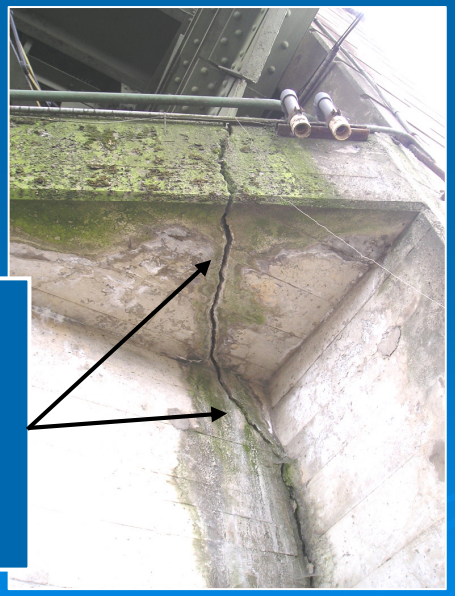
Widespread cracking in support pier



Cracks in support pier

Cracks in pier wall

Cracks under main truss bearing point



Measuring crack movement

High Seismic Risk

Bridge has been weakened by three earthquakes in 1949, 1965, and 2001

Damaged bridge rails in 2001

Damaged south approach in 2001

Load Capacity

Concrete deck slab at load limit

Safety Factor ≤ 1.0

Piling under bascule pier at load limit

Safety Factor ≤ 1.0

Steel deck truss at load limit

Safety Factor ≤ 1.0

Sufficiency Rating

Sufficiency Rating - federal coding system to rate adequacy of bridge

South Park Bridge = 4.0

55 possible points - Structural Adequacy and Safety

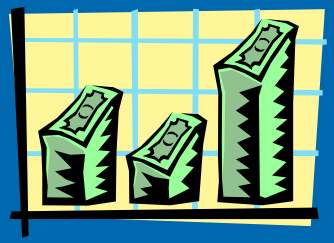
- **0 points** due to poor condition of primary structural component (substructure) and marginal load capacity

30 possible points - Serviceability and Functional Obsolescence

- **4 points** due to poor deck condition, narrow lanes and high traffic volume

15 possible points - Essentiality for Public Use

- **0 points** due to high traffic volume and 3 mile detour route



PROJECT COST *

TASK	AMOUNT (million)	NOTES
EIS and preliminary engineering	$9	fully funded
Intermediate/final design and permitting	$15	fully funded
Right of way acquisition	$4	STP funding
Construction of new bridge	$108	?

* **This project cost excludes construction administration and contingency**

THANK YOU